

REMARKS

Favorable reconsideration and allowance of the claims of the present application are respectfully requested.

In the present Office Action, Claim 18 is objected to because the originally filed claim is dependent on itself. In response to this objection, applicants have cancelled Claim 18.

The above amendment to Claim 18 obviates the informal ground of objection raised in the present Office Action. Applicants thus respectfully request that the objection to Claim 18 can and should be withdrawn.

In addition to canceling Claim 18, applicants have also amended Claims 1-8 of the present application. Specifically, Claim 1 has been amended to positively recite the hybrid substrate shown in FIG. 5D of the originally filed specification. Specifically, Claim 1 has been amended to positively recite a first region (see left of right hand side of FIG. 5D) having an upper surface of a second crystallographic orientation (see Paragraphs 0048 and 0052) comprising a bottom semiconductor layer 12 having a first crystallographic orientation (see Paragraphs 0048 and 0049) which is different from said second crystallographic orientation and a top semiconductor layer 18 (see Paragraphs 0048 and 0052) having said second crystallographic orientation, wherein said top and bottom semiconductor layers are vertically separated from each other by a bonding interface 14 (see Paragraph 0048), said top semiconductor layer has a thickness from about 200 nm to about 2 μ m and said interface has an oxide thickness of about 10 nm or greater; and a second region having an upper surface of said first crystallographic orientation which is substantially coplanar with said upper surface of said first region (see

Paragraph 0082), wherein said second region is absent of said bonding interface and comprises said bottom semiconductor layer 12 and an epitaxial semiconductor layer 34 (see middle section of FIG. 5D).

The above amendments to Claim 1, particularly changing the terms first and second semiconductor layers to bottom and top semiconductor layers, respectively necessitated the amendments to dependent Claims 2-7.

Claim 8 was also amended in a similar fashion to Claim 1.

Since the above amendments to the claims do not introduce new matter into the specification of the instant application, entry thereof is respectfully requested.

Claims 1-18 are rejected under 35 U.S.C. §103 as allegedly unpatentable over U.S. Patent Application Publication No. 2005/0082531 to Rim ("Rim"). Claims 1-5, 8-12 and 18 stand rejected under 35 U.S.C. §103 as allegedly unpatentable over U.S. Patent Application Publication No. 2004/0195646 to Yeo, et al. ("Yeo, et al."). Claims 1-7 stand rejected under 35 U.S.C. §103 as allegedly unpatentable over U.S. Patent Application Publication No. 2004/0075141 to Maeda, et al. ("Maeda, et al."). Claims 8-18 stand rejected under 35 U.S.C. §103 as allegedly unpatentable over the combined disclosures of Maeda, et al and Yeo, et al.

Concerning the obviousness rejection citing Rim, applicants submit that the statute under 35 U.S.C. § 103(c) states that:

Subject matter developed by another person, which qualifies as prior art only under one or more subsections (e), (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Applicants submit that the Rim. reference was applied by the Examiner as prior art under 35 U.S.C. § 103 via 35 U.S.C. § 102(e). Applicants note in this regard that MPEP § 706.02(k) states that:

"Effective November 29, 1999, subject matter which was prior art under former 35 U.S.C. § 103 via 35 U.S.C. § 102(e) is now disqualified as prior art against the claimed invention if that subject matter and the claimed invention "were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person."

This change to 35 U.S.C. § 103 is applicable to all utility, design, and plant applications filed on or after November 29, 1999 including continued prosecution applications (CPA) filed under 37 C.F.R. § 1.53(d). Applicants observe that the present application was filed on March 12, 2004; therefore the present application is entitled to the above change in 35 U.S.C. § 103.

In view of this, and the fact the present application and Rim "were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person", the Rim reference is disqualified as a reference under 35 U.S.C. § 103(c).

To evidence that the instant application and Rim "were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person", the assignment document of the present application (recordation date June 9, 2004 at Reel 014713, Frame 0989) was compared with the recorded assignment of Rim (recordation date October 17, 2003 at Reel 014627, Frame 0252). In both instances, the inventors conveyed their entire interest to International Business Machines Corporation; therefore establishing common ownership between the instant application and Rim.

In view of the above information, Rim is disqualified as art and, as such, the rejection to Claim 1-18 citing Rim can and should be withdrawn.

With respect to the remaining obviousness rejections citing Yeo, et al. alone, Maeda, et al. alone, or the combination of Maeda, et al. and Yeo, et al., applicants submit that the claims of the present application, as amended herein, are patentably distinguishable from these disclosures. Specifically, none of the applied references teach or suggest the structure recited in amended Claim 1 or amended Claim 8.

In amended Claim 1, the structure includes a first region having an upper surface of a second crystallographic orientation comprising a bottom semiconductor layer having a first crystallographic orientation which is different from said second crystallographic orientation and a top semiconductor layer having said second crystallographic orientation, wherein said top and bottom semiconductor layers are vertically separated from each other by a bonding interface, said top semiconductor layer has a thickness from about 200 nm to about 2 μ m and said interface has an oxide thickness of about 10 nm or greater; and a second region having an upper surface of said first crystallographic orientation which is substantially coplanar with said upper surface of said first region, wherein said second region is absent of said bonding interface and comprises said bottom semiconductor layer 12 and an epitaxial semiconductor layer 34.

In amended Claim 8, the structure includes a first device region having a first crystallographic orientation and a second device region having a second crystallographic orientation, said first crystallographic orientation is different from said second crystallographic orientation and said first device region is substantially coplanar to said second device region, wherein at least said first device region or said second device

region includes an upper semiconductor layer having a thickness from about 200 nm to about 2 μ m and an underlying bonding interface that has an oxide thickness of about 10 nm or greater, said underlying bonding interface vertically separating said upper semiconductor layer from a lower semiconductor layer said upper and lower semiconductor layers having different crystallographic orientations and said bonding interface is absent from the other device region.

Thus, in the claimed structures, one region of the structure includes the bonding interface and an upper surface having a certain crystallographic orientation and another region of the structure does not include the bonding interface and has an upper surface of a different crystallographic orientation, both upper surfaces are substantially coplanar with each other. Thus, in the claimed structures one region including the bonding interface has SOI properties, and the other region which does not have the bonding interface has bulk like properties.

Yeo, et al. provide a SOI chip that includes a first Si island with a surface of a first crystal orientation that overlies an insulator layer and a second Si island of a second crystal orientation that also overlies the insulator layer. In the prior art structures disclosed by Yeo, et al., the Si islands of different crystallographic orientation are located atop insulator 114. Applicants find no teach or suggestion in Yeo, et al. to provide applicants' claimed region in which a bottom semiconductor layer of a first crystallographic orientation and an epitaxial semiconductor is present without having a bonding interface.

Maeda, et al. provide a semiconductor device which is formed on a SOI substrate which includes a bottom semiconductor layer 1 having a (110) orientation and a top

semiconductor layer 3 having a (100) orientation which are vertically separated by insulating layer 2. The prior art structure disclosed in Maeda, et al. does not include regions having upper surfaces of different crystallographic orientation, as presently claimed.

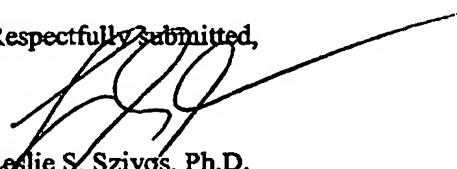
Applicants observe that the Examiner has recognized this distinction and has applied Yeo, et al. to alleviate the same. Applicants submit that although Yeo, et al. do disclose a structure having regions of different surface crystal orientations, the applied reference does not teach or suggest applicants' claimed region in which a bottom semiconductor layer of a first crystallographic orientation and an epitaxial semiconductor is present without having a bonding interface. In Yeo, et al., insulating layer 114 is present beneath each of the different device regions. As such, the combined teachings of Maeda, et al. and Yeo, et al. would provide a structure having different regions of different crystal orientations wherein an insulating layer, i.e., applicants' claimed bonding interface, is present beneath each of the regions.

The various §103 rejections also fail because there is no motivation in the applied references which suggest modifying the disclosed structures to include the various elements recited in the claims of the present invention. Thus, there is no motivation provided in the applied references, or otherwise of record, to make the modification mentioned above. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Vaeck, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991).

The rejections under 35 U.S.C. §103 have been obviated; therefore reconsideration and withdrawal thereof is respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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